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ABSTRACT

Computer routines for the translation of teacher-prepared mark sense forms to magnetic tape are described. The program, Receiving IMS (RIMS), is part of the Southwest Regional Laboratory's (SWRL) Instructional Management System (IMS). It accepts mark sense sheets from remotely located Xerox 660 scanner copiers and/or IMS update information from remotely located teletypes. Output is a magnetic tape which is then sent over phone lines to an IMS processing program in a larger, remote computer. (Author/DGC)

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RIMS PROGRAM DESCRIPTION

1.0 - PROGRAM IDENTIFICATION

RIMS

2.0 - OBJECTIVE

Program RIMS accepts IMS Mark sense sheets from remotely located Xerox 660 scanner copiers and/or IMS update information from remotely located teletypes. Output is a magnetic tape which is then sent over phone lines to an IMS processing program in a larger, remote computer.

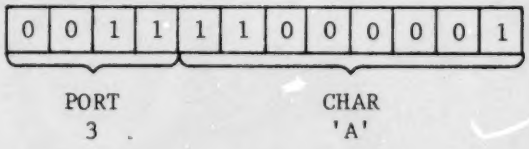
3.0 - GENERAL DATA STRUCTURE

Program RIMS uses the 2nd 690 memory module for data. Locations 10000_8 through 15277_8 are divided into 72_{10} tape record buffers comprising 40_{10} words each. Locations 15300_8 through 17777_8 are divided into 10_8 word blocks which are linked during run time and dynamically connected to form information queues.

Locations 03400_8 through 04017_8 are divided into 10_{10} tables consisting of 27_{10} words each. These tables are assigned to ports 0 through 9 and the specific control information for each port is kept in there.

4.0 - GENERAL LOGIC STRUCTURE

Program RIMS runs with the interrupt on. As characters are input to the various ports, RIMS reads the character and appends as the left-most 4 bits a binary representation of the port number through which it entered. Thus, an odd parity 'A' from port 3 would produce the following datum:



This datum is passed on to a front end which determines the type of device on that port and schedules the appropriate handler. This handler may either store the character until, as in the case of a scanner, a whole sheet is collected before actual processing; or, as with the update portion, process it immediately.

If processing is to take place, the data from the port-specified tables is moved to a common working area located on page zero. The processing is then done and the resultant control data read back to the port specific areas and the mag tape write scheduled, if appropriate.

5.0 - PARTICULAR LOGIC STRUCTURE

5.1 - Start up - The program starts by writing the date, as entered on the console TTY by the operator, onto tape unit 3. Since this preliminary work is done in an area of core which subsequently becomes port-specific data area, the program cannot be restarted without reloading.

Log on - Each port is assigned a status of 0 at start up time. This value indicates an unused port. As characters enter the system through a currently unused port, RIMS waits for a carriage return then searches for one of the sign on sequences:

↑E↵ for a scanner ↑S ↑W ↑R ↑L↵ for an updating TTY

and reassigns the status of that port accordingly. (↑= CONTROL KEY) Log on sequences can be sensed only from ports with a status of 0: unused.

5.2 - Update Processing - If the status register for a given port=1, it is a remote TTY. Incoming characters must be processed immediately; therefore, the port-specific data is moved to the common area with every input character.

The program tests for Rubouts, Question Marks, Line Feeds, Carriage Returns, and Left Carets at any time and provides the appropriate response. If the input character is the 2nd in any given line, it checks for an equals sign (=), which indicates an update of the static data is to be performed, and then performs the appropriate response after the carriage return.

All other characters are stored, two to a word in XS-40 code in one of the 40_{10} word buffers in the locations they will occupy when the record is written. A check is made for the input character being a digit which indicates a group number and end of alpha input. RIMS tests for more than one digit or more than 20_{10} alpha characters. In each case, a BEL is echoed instead of the input character when an overflow condition exists

When a carriage return is entered, the condition of bit 0 of the status word is sampled. If =0, a record is written; if =1, the TTY is in the test mode and the buffer is deleted.

5.3 - Scanner - When the log on sequence is sensed, RIMS sends 2 XONs and reassigns the status of that port to 2· awaiting a new sheet from the scanner. As each new sheet is encountered, the first four characters are collected. These are examined for program number and the appropriate number of remaining characters for that sheet - including carriage return and line feed - are set into a counter and that many more characters are collected and saved in queues.

As any character enters the scanner logic, it is first tested for parity. If a parity error occurs, RIMS discards all further characters through that port until a line feed is encountered. RIMS then attempts to send 3 reject characters. If the output line is available, it sends the first of them immediately; otherwise, they are sent as the line becomes available. There should never be an output line unavailable for the first reject character.

If the character is found to observe correct parity, it is tested for being a line feed. If it is a line feed at the wrong time or not a line feed when one was expected, the sheet is treated as a parity error.

When the number of characters expected have been received, the specific data for that port is moved into the general working area.

As scanner sheets proceed through the logic, a test is made for end-of-class (EOC), end-of-transmission (EOX), or class ID. If the sheet is an EOC sheet, the end of class indicator is set; if the sheet is an EOX sheet, status is reset to unused port and two BELs sent to the remote site; if it is a class ID sheet, the end of class indicator is cleared and the sheet is rejected.

If it is any other kind of sheet, the end of class indicator is tested. If set, the sheet is rejected.

FYCSP sheets are decoded by comparing a student response line to a mask of the response positions. The mask and the response line are rotated in unison; as each one-bit in the mask - representing a response position - is encountered, the corresponding bit position in the response line is rotated into a word which will represent the responses made. This representation is right-justified as follows: if the student marked response position 1 and 3 with 3 response positions possible, the result would be 0005; if 4 response positions were available (currently not possible; this is for expansion) the result would be 0012; if 5 responses available, 0024. This value is then used as an index into a conversion table which yields a digit from 0-5 or an alpha character from A to Z which corresponds to the response pattern made.

LMS and MBS sheets are processed by combining common routines that position response lines and then rotate them through the link to produce the 0 or 1 response states. The resultant record will have 0 in all marked response fields and 1 in all unmarked response fields. If there is no information on a given line, the line is ignored but the student number counter is, of course, stepped.

Cover sheets are processed by expanding binary coded fields to XS40 digits; positional fields are decoded by using the first marked position within the field reading left to right.

In all cases where records are to be written, a buffer to construct the records is obtained, filled, and the location of the record is passed to the mag tape write routine. When new buffers are obtained, a check is made for there being at least 10 buffers available. If not, an indicator is set to stop processing until the tape routine catches up and XOFF is sent to all scanners on the system. When the tape catches up, XON is sent to all scanners on the system.

5.4 - Console Control - RIMS collects characters from the console until a carriage return is encountered. At this point, it examines the first character of the line to determine what action is to be performed.

6.0 - LOCAL OPERATING INSTRUCTIONS

6.1 - SYSTEM SETUP

6.1.1 - Mount a write enabled tape on logical tape drive 3

6.1.2 - Call program IRPS

6.1.3 - Call program RIMS

6.1.4 - Turn on paper tape punch

6.2 - INITIAL DIALOGUE

When RIMS starts up, it logs DATE= on the local TTY. The operator should respond with a six digit date (in the form of MMDDYY) and no carriage return.

6.2.1 - If RIMS does not carriage return, it was unable to access tape drive 3. Remedy the situation and RIMS proceeds.

6.2.2 - If no date is to be written, strike the RUBOUT key.

6.3 - RUN DIALOGUE

6.3.1 - When a remote device signs on, the local TTY logs)XPON) where X is either S for scanner or T for teletype and P is the port number associated with the remote device.

6.3.2 - When a remote device signs off, the local TTY logs)XPOFF) where X and P are as above. The 690 operator should hang up the correct phone (See 6.5).

6.3.3 - When an acceptable cover sheet from a scanner is encountered, RIMS will log P> DD SS TT GG CC where P=port #; DD=district #; SS=school #; TT=teacher #; GG=grade #; CC=class #.

6.4 - COMMAND FEATURES

6.4.1 - Monitoring - To monitor the characters <u>transmitted</u> to a site, type MP) where P is the port number. All characters sent to that site - including the echoes of the remote update users input - will then also be sent to the local TTY. A port may be set into the Monitor state before log-on or even dial-up. Note that it makes little sense to monitor a scanner. All that will happen is that the local TTY will glitch when a reject, XON, or XOFF character is sent.

It is barely conceivable that a remote user at a 30 character per second terminal can maintain a character throughout average of greater the 10 cps for any significant length of time. Should this happen, however, the local TTY - which runs at 10 cps - will get more and more behind, causing a space squeeze and danger of system crash. Thus, if monitoring is taking place and the local TTY is typing characters <u>without any interruption of rhythm</u>, use the Break Monitoring Command.

6.4.2 - Break Monitoring - To stop monitoring a given port, type B). Local TTY output of the monitored port will cease <u>after</u> the current stacked input, if any, is logged. To change from monitoring one port to any other port, it is not necessary to type B) first. Merely do a MP with the new P. Again, the new port's data, although loaded immediately into the TTY output queue, will appear only <u>after</u> the stacked input, if any, from the previous port is output.

6.4.3 - Test Mode - It seems advisable to allow on-line training for users of the TTY Update Function. Such a feature allows the remote user to massage all the command and editing functions of the Update Program but not write records to tape. To do this, type DP/ where P is the port number (D stands for Disable). This can only be done after log-on has been successful. A trainer at the remote site will voice contact the local operator to request this feature.

6.4.4 - Clear Test Mode - After sufficient practice, as determined by the trainer, the local operator is requested to put the testing teletype back into the normal, record producing, state. To do this, type EP/ where P is the port number (E stands for Enable). Note that the "wake up" state of the system is with all ports enabled.

6.4.5 - Clear Log-On Status - Inevitably, someone will forget to log off a TTY or transmit the End-of-Transmission sheet from a scanner. Type CP/ where P stands for the port number. The local TTY will log /PPOFF/ where the second P is the port number.

6.4.6 - Talk to User - If the local operator should wish to communicate with a remote update user, type /P MESSAGE/ where P is the port number and MESSAGE is whatever you wish to say. The message is <u>not</u> sent until the carriage return. It would be best to send, as your first message, several BELS (control G) and, of course, the carriage return to alert them that a message is coming. After saying what you want to say, instruct them to strike either line delete or line feed, because their recent TTY output may be indecipherable in regard to updating. Note that /P must precede every message line.

6.4.7 - Run Complete - To end-file the tape and exit RIMS, type control C/. The tape is end-file <u>after</u> stacked tape requests, if any, are processed. The tape is <u>not</u> rewound. Monitor is re-entered.

6.4.8 - Cancel Command - To cancel a command line to the local TTY, strike the RUBOUT key and a carriage return. If you have already struck a carriage return, it's too late.

6.4.9 - Incomprehensibility - If RIMS could not make sense out of a local TTY command, it types /?/.

6.5 - PORT NUMBERS, PHONE NUMBERS, AND DEVICE NUMBERS

Port 0 and Ports 4 through 9 are, as yet, undefined.

Port 1 is device #42-43, currently phone 779-3885

Port 2 is device #44-45, currently phone 779-3913

Port 3 is device #40-41, currently phone 779-3927

7.0 - TELETYPE UPDATE PROGRAM - REMOTE USAGE

7.1 - LOGIN

Upon dialing in and obtaining the carrier signal, the operator at the TTY will depress the control key and type SWRL, release the control key, and type a carriage return.

7.2 - INITIALIZATION

The program will respond by typing "DATE=". The operator will respond by entering 6 digits: the first two being the year, the next two the month, and the last two the day followed by a carriage return. There must be no imbedded blanks or implicit zeroes.

The program then asks

DISTRICT (D) =

SCHOOL (S) =

TEACHER (T) =

GRADE LEVEL (L) =

CLASS (C) =

and expects one or two digits followed by a carriage return after each one. There may be no leading, trailing, or imbedded blanks. There may be leading implicit zeroes, however.

7.3 - DATA INPUT

After the initialization is complete, data may be entered. This is signified by the presence of an asterisk. The operator types the student name, followed by an optional group number, and strikes the carriage return to enter the record.

A maximum of twenty alpha characters (blanks are counted) may be entered for the name. The 21st and subsequent alpha characters which are typed will not echo (i.e., be logged on the teletype) and a bell will sound to indicate that the name field is being exceeded. The excess characters are ignored.

One digit may be entered at the end of the name to indicate group. This character does not count as one of the 20 allowed alpha characters in the name field. If more than one digit is entered, a bell will ring and the digit will not echo. Care should be taken when entering a group number since the program senses digits and terminates the name field upon encountering a digit.

7.4 - EDITING

Striking the rubout key will cause characters to be deleted from right to left one character per rubout. Rubbed out characters are bracketed by carets. For example:

JONES BOBERT<TREBOB>ROBERT

After the T, 6 rubouts were struck followed by the correct first name. To cancel an entire line, the operator strikes a left caret (<).

7.5 - INTERROGATION

When a name is entered and the carriage return struck, the name data is combined with the current values for District, School, Teacher, Grade Level, and Class. Should the operator be unsure of the current contents of these fields, he may:

7.5.1 - Instead of entering a name, type ? followed by a carriage return. The program will respond by typing

D = xx
S = xx
T = xx
L = x
C = x

where x is a digit and the current value for the field.

7.5.2 - At the end of the student name and group number, if any, type ? and the program will log dd ss tt l c (that is, the digits corresponding to those values) at the end of the student name. This allows the

operator to verify the data before striking the carriage return (if it is as he wants it) or the line delete (if it is not).

7.6 - FIELD UPDATING

In order to change the value of District, School, Teacher, Grade Level, or Class, the operator types a letter (D, S, T, L, or C respectively), an equal sign (=), followed by one or two digits and a carriage return.

7.7 - LOG OFF

To log off the system, type ==) . The system will respond by typing LOGOFF.

7.8 - FORMS COORDINATION

In order to facilitate operation, it is suggested that the encoding forms to be used by the operator when entering the data look like this:

Columns 1-20	Name Field
Column 21	Group
Column 22	Blank
Columns 23-24	District
Columns 26-27	School
Columns 29-30	Teacher
Column 32	Grade Level
Column 34	Class